

NAG Library Routine Document

F16ELF (BLAS_DSUM)

Note: before using this routine, please read the Users' Note for your implementation to check the interpretation of *bold italicised* terms and other implementation-dependent details.

1 Purpose

F16ELF (BLAS_DSUM) sums the elements of a real vector.

2 Specification

```
FUNCTION F16ELF (N, X, INCX)
REAL (KIND=nag_wp) F16ELF
INTEGER          N, INCX
REAL (KIND=nag_wp) X(1+(N-1)*ABS(INCX))
```

The routine may be called by its BLAST name *blas_dsum*.

3 Description

F16ELF (BLAS_DSUM) returns the sum

$$x_1 + x_2 + \cdots + x_n$$

of the elements of an n -element real vector x , via the function name.

If $N \leq 0$ on entry, F16ELF (BLAS_DSUM) returns the value 0.

4 References

Basic Linear Algebra Subprograms Technical (BLAST) Forum (2001) *Basic Linear Algebra Subprograms Technical (BLAST) Forum Standard* University of Tennessee, Knoxville, Tennessee <http://www.netlib.org/blas/blast-forum/blas-report.pdf>

5 Arguments

- | | | |
|----|---|--------------|
| 1: | N – INTEGER | <i>Input</i> |
| | <i>On entry:</i> n , the number of elements in x . | |
| 2: | $X(1 + (N - 1) \times INCX)$ – REAL (KIND=nag_wp) array | <i>Input</i> |
| | <i>On entry:</i> the n -element vector x . | |
| | If $INCX > 0$, x_i must be stored in $X((i - 1) \times INCX + 1)$, for $i = 1, 2, \dots, N$. | |
| | If $INCX < 0$, x_i must be stored in $X((N - i) \times INCX + 1)$, for $i = 1, 2, \dots, N$. | |
| | Intermediate elements of X are not referenced. If $N = 0$, X is not referenced. | |
| 3: | INCX – INTEGER | <i>Input</i> |
| | <i>On entry:</i> the increment in the subscripts of X between successive elements of x . | |
| | <i>Constraint:</i> $INCX \neq 0$. | |

6 Error Indicators and Warnings

If $INCX = 0$, an error message is printed and program execution is terminated.

7 Accuracy

The BLAS standard requires accurate implementations which avoid unnecessary over/underflow (see Section 2.7 of Basic Linear Algebra Subprograms Technical (BLAST) Forum (2001)).

8 Parallelism and Performance

F16ELF (BLAS_DSUM) is not threaded in any implementation.

9 Further Comments

None.

10 Example

This example computes the sum of the elements of

$$x = (1.1, 10.2, 11.5, -2.7, 9.2)^T.$$

10.1 Program Text

```

Program f16elfe

!      F16ELF Example Program Text

!      Mark 26 Release. NAG Copyright 2016.

!      .. Use Statements ..
      Use nag_library, Only: blas_dsum, nag_wp
!      .. Implicit None Statement ..
      Implicit None
!      .. Parameters ..
      Integer, Parameter          :: nin = 5, nout = 6
!      .. Local Scalars ..
      Real (Kind=nag_wp)         :: sumval
      Integer                    :: i, incx, ix, n
!      .. Local Arrays ..
      Real (Kind=nag_wp), Allocatable :: x(:)
!      .. Intrinsic Procedures ..
      Intrinsic                   :: abs
!      .. Executable Statements ..
      Write (nout,*) 'F16ELF Example Program Results'

!      Skip heading in data file
      Read (nin,*)

      Read (nin,*) n, incx
      Allocate (x(1+(n-1)*abs(incx)))

!      Read the vector x and store forwards or backwards
!      as determined by incx.
      If (incx>0) Then
         ix = 1
      Else
         ix = 1 - (n-1)*incx
      End If

      Do i = 1, n
         Read (nin,*) x(ix)
         ix = ix + incx
      End Do

!      Sum the elements of x

      sumval = blas_dsum(n,x,incx)

```

```
      Write (nout,*)
      Write (nout,99999) sumval

99999 Format (1X,'Sum of elements of x is',F9.5)
      End Program f16elfe
```

10.2 Program Data

```
F16ELF Example Program Data
  5      1                               : n and incx
  1.1
 10.2
 11.5
 -2.7
  9.2                               : Vector x
```

10.3 Program Results

```
F16ELF Example Program Results

Sum of elements of x is 29.30000
```
